

Contributed Talk

Splinter Exoplanets

MATTER UNDER PLANETARY INTERIOR CONDITIONS

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The new DFG Research Unit FOR 2440 *Matter Under Planetary Interior Conditions* aims at improving the understanding of the composition and structure of planetary interiors through an interdisciplinary approach, involving experiments, theory and modeling activities. The joint research program is performed at the BGI at U Bayreuth, DESY Hamburg, the DLR Institute for Planetary Research Berlin, the European XFEL GmbH Schenefeld, TU Berlin, and the U Rostock.

We study the physical properties of rock-forming minerals and complex molecular mixtures, which are relevant for super-Earths and Neptune-sized planets. Experimentally, structural properties and phase stabilities will be investigated using novel methods of high pressure and plasma physics enabling to access the pressure–temperature regime relevant for deep planetary interiors. Simultaneously, *ab initio* simulations will be performed in order to predict the thermophysical properties of these materials for a wide range of pressure and temperature. These simulations will be benchmarked by experiments, but will also be important for the preparation and evaluation of the proposed experiments. The acquired data will be used to constrain new models for the interior and the evolution of super-Earths and Neptune-like planets and for the evaluation of a proposed new observable, the tidal Love number $k_{2,f}$ as a measure for central mass concentration.

The modeling results including the tidal Love number shall be applied to evaluate observational data from running and future space missions such as GAIA, TESS, CHEOPS und PLATO 2.0.